

Alexander S. Mikherdov

PhD in Organometallic Chemistry

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General

Date of Birth: 19th August 1993; **Place of Birth:** St Petersburg, Russia

Education

Sept 2015 – Aug 2019 **Candidate of Sciences Degree in Organometallic Chemistry** (eq. PhD), St Petersburg State University (issued at St Petersburg State Technical University), St Petersburg, Russia;
Supervisor: [Prof. V. P. Boyarskiy](#);
Thesis: Noncovalent interactions in palladium(II) diaminocarbene complexes;

Sept 2010 – Jul 2015 **Diploma in Chemistry**, St Petersburg State University, St Petersburg, Russia;
Supervisor: [Prof. V. P. Boyarskiy](#)
Thesis: Interaction of α -aminoazoles and isocyanide ligands in palladium complexes;

Research Experience

Sept 2022 – March 2023 **WPI-ICReDD Postdoctoral Fellow**, Hokkaido University, Sapporo, Japan, [Research group of Prof. Mingoo Jin](#); *Research topic:* Development of amphidynamic crystalline materials based on organometallic chemistry;

Sept 2021 – Sept 2022 **JSPS Postdoctoral Fellow**, Hokkaido University, Sapporo, Japan, [Research group of Prof. Hajime Ito](#); *Research topic:* Rational design of co-crystals involving gold complexes for new luminescent materials;

Sept 2019 – Aug 2021 **Assistant Lecturer/Researcher**, Institute of Chemistry SPbU, St Petersburg, Russia; *Research topic:* Noncovalent interactions involving isocyanides, carbenes, and their metal complexes;

Sept 2015 – Aug 2019 **PhD Researcher**, Institute of Chemistry SPbU, St Petersburg, Russia, [Research group of Prof. Vadim Yu. Kukushkin](#); *Research topic:* Noncovalent interactions in isocyanide/diaminocarbene complexes of platinum group metals;

Oct – Nov 2018 **Internship University of Jyväskylä**, Jyväskylä, Finland, [Research group of Prof. Matti Haukka](#); *Research topic:* Organoselenium compounds as halogen bond acceptors;

2016, 2017 **Internships University of the Free State**, Bloemfontein, South Africa, Research group of Prof. Andreas Roodt; *Research topics:* Jul – Aug 2017 – Kinetics of the isomerization of binuclear diaminocarbene Pd^{II} complexes; Nov – Dec 2016 – Mechanistic and kinetic study of addition of *O(H)*- and *N(H)*-nucleophiles to nitrilium *closo*-decaborate clusters

Teaching Activities

Sept – Dec 2019 Organic chemistry laboratory course (Institute of Chemistry SPbU)
Jan – May 2017 General chemistry course for high school students (Faculty of Biology SPbU)

Skills

Lab skills Synthes of inorganic, coordination, and organic compounds;
Crystal engineering;
Reaction kinetics studies

Software *Basic:* ChemOffice, Microsoft Office, EndNote
Crystal data refinement and analysis: Olex2 (Shelx), CCDC Software (ConQest, Mercury, IsoStar), CrystalExplorer
Data fitting, analysis, and visualization: Origin, MatLab, VMD
Theoretical calculations: Gaussian, Multiwfn, Chemcraft

Equipment Single-crystal and powder X-ray diffraction,
UV-vis, fluorescence, IR spectroscopy
NMR spectroscopy

Funding (As Principal Investigator or Fellow)

- 2021–2022 [JSPS Postdoctoral Fellowship for Research in Japan \(Short-term\)](#): “Rational design of co-crystals involving gold isocyanide complexes for new luminescent materials”; Developed in Hokkaido University (Host)
- 2018–2020 [RFBR](#) research grant (18-33-00704 mol_a): “Effect of non-covalent interactions on the structure and properties of aminocarbene complexes of platinum group metals”; Developed in Saint Petersburg State University (Host).

Scholarships and Awards

- 2021 *Medal of the Russian Academy of Sciences for Young Scientists* (by Russian Academy of Sciences)
- 2019 *INEOS Open Cup 2019 Best Poster Presentation* (by INEOS RAS)
- 2018 *Laureate of Struchkov Prize for Young Scientists* (by Struchkov Prize Society)
- 2018 *V. I. Spitsyn Prize for Young Scientists* (by Chemical Department of Moscow State University)
- 2018 “*Analit-Shimadzu*” Scholarship (by Analit Ltd.)

Selected Publications

1. **A. S. Mikherdov***, A. S. Novikov, V. P. Boyarskiy, V. Yu. Kukushkin*, «The Halogen Bond with Isocyano Carbon Reduces Isocyanide Odor», *Nature Communications*, 2020, 11, 2921; DOI: [10.1038/s41467-020-16748-x](https://doi.org/10.1038/s41467-020-16748-x);
2. S. A. Katkova, **A. S. Mikherdov***, M. A. Kinzhalov, A. S. Novikov, A. A. Zolotarev, V. P. Boyarskiy, V. Yu. Kukushkin*, «(Isocyano Group π -Hole)···[dz²-M^{II}] Interactions at (Isocyanide)[M^{II}] Complexes, where Positively Charged Metal Centers (d⁸M = Pt, Pd) Act as Nucleophiles», *Chemistry – A European Journal*, 2019, 25, 8590–8598; DOI: [10.1002/chem.201901187](https://doi.org/10.1002/chem.201901187);
3. M. A. Kinzhalov*, M. V. Kashina, **A. S. Mikherdov**, E. A. Mozheeva, A. S. Novikov, A. S. Smirnov, D. M. Ivanov, M. A. Kryukova, A. Yu. Ivanov, S. N. Smirnov, V. Yu. Kukushkin, K. V. Luzyanin*, «Dramatically Enhanced Solubility of Halide-Containing Organometallic Species in Diiodomethane: The Role of Solvent···Complex Halogen Bonding», *Angewandte Chemie International Edition*, 2018, 57, 12785–12789; DOI: [10.1002/anie.201807642](https://doi.org/10.1002/anie.201807642);
4. **A. S. Mikherdov**, A. S. Novikov, M. A. Kinzhalov, V. P. Boyarskiy*, G. L. Starova, A. Yu. Ivanov, V. Yu. Kukushkin*, «Halides Held by Bifurcated Chalcogen–Hydrogen Bonds. Effect of $\mu_{(S,N-H)}Cl$ Contacts on Dimerization of Cl(carbene)Pd^{II} Species», *Inorganic Chemistry*, 2018, 57, 3420–3433; DOI: [10.1021/acs.inorgchem.8b00190](https://doi.org/10.1021/acs.inorgchem.8b00190);
5. **A. S. Mikherdov**, M. A. Kinzhalov, A. S. Novikov, V. P. Boyarskiy*, I. A. Boyarskaya, D. V. Dar'in, G. L. Starova, V. Yu. Kukushkin*, «Difference in Energy between Two Distinct Types of Chalcogen Bonds Drives Regioisomerization of Binuclear (Diaminocarbene)Pd^{II} Complexes», *Journal of the American Chemical Society*, 2016, 138, 14129–14137; DOI: [10.1021/jacs.6b09133](https://doi.org/10.1021/jacs.6b09133);

* – corresponding author

Selected Presentations

1. “The noncovalent approach in the design of luminescent crystalline rotors”, *The 102nd CSJ (The Chemical Society of Japan) Annual Meeting*, online, **2022** (oral)
2. “Noncovalent interactions with isocyanides and their metal complexes”, *CHAINS 2019: Chemistry as Innovating Science*, Eindhoven, Netherlands, **2019** (poster)
3. “Non-covalent interactions in isocyanide/diaminocarbene complexes of platinum group metals”, *43rd International Conference on Coordination Chemistry (ICCC 2018)*, Sendai, Japan, **2018** (oral)

References

Prof. Vadim Yu. Kukushkin

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Prof. Andreas Roodt

University of the Free State, Bloemfontein, South Africa
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Prof. Hajime Ito

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Prof. Mingoo Jin

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